QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR THE

SHALLOW SOIL SAMPLING

AT THE

JEWETT WHITE LEAD COMPANY

STATEN ISLAND, NEW YORK

Project Officer's Signature: _____ Date: 12/15/08

Project Officer's Name: Michael A. Mercado, Environmental Scientist

Project Quality Assurance Officer's Signature: Pat Sheridan Date: 12/15/08

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Date Prepared: July 21, 2008

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1.0 Project Description

1.1 Problem Definition/Background

Jewett White Lead Co. site is located at the corned of Richmond Terrace and Park Ave. The address is 2000 Richmond Terrace, Port Richmond, Block 1006, lot 32, New York. The site is in a manufacturing zone with business adjoining the site and residential housing within 90 feet of the site.

From 1839 to 1898, the property was owned by Jewett & Son's White Lead Company, where white lead was produced. In 1898, the property was sold to National Lead Industries, producers of Dutch Boy Paints. Between 1949 and 1990 the property switched hands through a myriad of private owners and was recently purchased as a speculative venture.

In June 2008, the Council of the City of New York requested that EPA review the site as a potential Brownfields location. In July 2008, The Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Support Team (SST) has been requested by the EPA Emergency Remedial and Response Division (ERRD) to conduct a sampling event to assist in characterization of the shallow soils within the site property boundaries.

On October 3, 2008, Creative Habitat Corp conducted a Site Investigation and provided a summary report of the preliminary investigation into the alleged presence of lead in the soil at Jewett White Lead Company Site. Four test pits approximately 5 feet deep were dug. Samples were taken from three strata, 0 to 15 inches, 15 to 30 inches, and 30 to 48 inches. A composite sample was composed from sample from each of the four test pits for each of the three strata. Grab samples were taken from hole #2 and hole #3 at each of the three strata. The result of the analysis of these samples show elevated levels of lead at 0 to 15 inches and 15 to 30 inches. The photos also indicated that brick, gravel, concrete, and roots were present in the pits and that augers were not the ideal choice for collecting the samples.

On November 13, 2008, after review the summary report of October 3 above, ERRD requested a change to the sampling event from characterization to delineation.

1.2 Project/Task Description:

The purpose of this sampling event is to evaluate and delineate the potential of lead and PCB contamination on site. A Systematic Random Sampling Method will be used. The samples will be taken within a 50-foot square grid pattern, at four different depths. The depths will be 0 to 3 inches, at 12 inches at 24 inches and at 36 inches. It is anticipated that the maximum number of samples taken in this event would be sixty. Samples will be analyzed for Target Analyte List (TAL) metals and PCBs.

The purpose and scope of this QAPP is to specify the details related to the collection, analysis and validation of the soil samples to be collected by the USEPA Region 2, Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Support Team (SST) during December 15 – 23, 2008. See Table 1 for activity schedule.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

2.1 Project/Task Organization

Table 3 identifies the key personnel and their corresponding responsibilities. Due to the work breakdown structure of the project, an organization list is provided instead of a concise organization chart.

2.2 Documentation and Records

The data collected for the sampling activities will be organized, analyzed, and summarized in a final project report that will be submitted the OSC according to the Project Schedule. The report will be prepared by the project officer and include appropriate data quality assessment. Standard methods and references will be used as guidelines for data reduction and reporting. All data generated will be reported in the standard CLP deliverable format.

3.0 QUALITY ASSURANCE (QA) OBJECTIVES FOR MEASUREMENT DATA (PARCC)

3.1 Quality Objectives and Criteria for Measurement Data

To assess data quality, PARCC (Precision, Accuracy, Representativeness, Completeness, and Comparability) parameters will be utilized. This is an integral part of the overall monitoring network design. Precision and accuracy are expressed in purely quantitative terms. The other parameters are only expressed using a mixture of quantitative and qualitative terms. All of these parameters are interrelated in terms of overall data quality and they may be difficult to evaluate separately due to these interrelationships. The relative significance of each of the parameters depends on the type and intended use of the data being collected. Therefore, these essential data quality elements are delineated as follows.

3.1.1 Analytical and sample collection precision

- For Organic Samples:

To assess error associated with analyte interference with the quantization of other analytes and error due to laboratory bias and precision, Matrix Spike and Matrix Spike Duplicate samples (MS/MSDs) will be collected all VOA, BNA, PCB, pesticide and herbicide samples. Hence, one sample will have three aliquots. The first aliquot will be analyzed routinely for the parameters of interest, while the other two aliquots will be spiked with known quantities of the parameters of interest prior to analysis. The Relative Percent Difference (RPD) between the two results will be calculated and used as an indication of the precision of the analyses performed. The equation for this calculation is presented below.

$$RPD = \frac{|MSR - MSDR|}{(MSR+MSDR)/2} \times 100$$

where: MSR = Matrix Spike Recovery
MSDR = Matrix Spike Duplicate Recovery
| | indicates absolute value of the difference. Hence, RPD is always expressed as a positive value.

- For Inorganic Samples:

To assess error associated with analyte interference with the quantization of other analytes and error due to laboratory bias and precision, Matrix Spike and Duplicate samples (MS/Ds) will be collected. Hence, one sample will have three aliquots. The first aliquot will be analyzed routinely for the parameters of interest, while the other two aliquots will be spiked with known quantities of the parameters of interest prior to analysis. The Relative Percent Difference (RPD) between the two results will be calculated and used as an indication of the precision of the analyses performed. The equation for this calculation is presented below.

$$RPD = \frac{|S - D|}{(S+D)/2} \times 100$$ Where: S = Sample Result (original)
D = Duplicate Result

| | indicates absolute value of the difference. Hence, RPD is always expressed as a positive value.

Sample collection precision and data representativeness will be assessed by collecting field replicate samples. The field replicates will be used to evaluate errors associated with sample heterogeneity, sampling methodology and analytical procedures. The analytical results from these samples will provide data on the overall measurement precision.

3.1.2 Analytical and sample collection accuracy

Analytical accuracy will be assessed through the analysis of quality control samples specified in the analytical method (i.e., matrix spike, surrogate spike). The quality control samples will be used to reduce the sources of error associated with sample matrix, sample preparation and analysis techniques. Accuracy is defined as a measure of how close an analytically determined concentration is to the true value.

The analytical accuracy will be expressed as the percent recovery (%R) of an analyte which has been added to the environmental sample at a known concentration before analysis and is calculated according to the following equation.

$$\%R = [(A-B)/C] \times 100$$

where: A = The analyte concentration determined experimentally from the spiked sample.
B = The unspiked sample concentration.
C = The amount of spike added.

To assess sample accuracy, field quality control (QC) samples are usually collected including a rinsate, and/or field blanks. The blanks would be used to evaluate errors arising from potential cross-contamination due to: improper handling of samples by collectors and lab personnel; improper decontamination procedures; improper shipment and storage; and/or on-site atmospheric contaminants.

3.1.3 Data representativeness

As previously discussed, data representativeness will be assessed by collecting field replicate samples and utilizing the proper sampling techniques and procedures. The field replicates are by definition equally representative of a given point and space and time. Representativeness is a qualitative parameter which is dependent upon the proper design of the sampling program and proper laboratory protocol. Therefore, data representativeness will be satisfied by ensuring that:

- The sampling program is followed according to:

- U.S. EPA (Environmental Protection Agency). October 1989. *Region II CERCLA Quality Assurance Manual.* Final Copy, Revision 1. Division of Environmental Services and Assessment, Edison, NJ; and

- U.S. EPA (Environmental Protection Agency). December 1995. *Superfund Program Representative Sampling Guidance.* OSWER Directive 9360.4-10. Interim Final. EPA/540/R-95/141. Office of Emergency and Remedial Response (OERR) Washington, D.C. (AppendixC)

- Proper sampling techniques are used in accordance with:

  - U.S. EPA (Environmental Protection Agency). January 1991. *Environmental Response Team (ERT) Standard Operating Procedure (SOP) #2012: Soil Sampling;* from the *Compendium of ERT Soil Sampling and Surface Geophysics Procedures.* Interim Final. EPA/540/P-91/006. Office of Emergency and Remedial Response (OERR), Washington, DC. The SOP is enclosed as Appendix D.

- Proper analytical procedures are followed and holding times of the samples are not exceeded in the laboratory according to:

  - U.S. EPA. January 2008. SOP # *MAL-3: Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples by Inductively Coupled Plasma-Mass Spectrometry,* Revision# 3, DESA/HWSB. Edison, NJ (Appendix E).

  - U.S. EPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analysis, Multi-Media, Multi-Concentration (SOM01.2). Office of Emergency and Remedial Response (OERR), Analytical Operations Center (AOC), Washington, DC (Appendix G).

3.1.4 Data completeness

Data completeness will be expressed as the percentage of valid data obtained from measurement system. For data to be considered valid, it must meet all the acceptable criteria including accuracy and precision, as well as any other criteria specified by the analytical method used.

- PCBs data generated by the CLP Laboratory will be validated by USEPA Region II, DESA/HWSB/HWSS according to the appropriate and current U.S. EPA Region II Data validation SOPs.

- TAL metals data generated by the Mobile Laboratory will be validated according to the *U.S.* EPA. January 2008. SOP # *MAL-3: Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples by Inductively Coupled Plasma-Mass Spectrometry,* Revision# 3, DESA/ HWSB. Edison, NJ (Appendix E).

With 100% validation, the rationale for considering data points non-critical is not required.

3.1.5 Data comparability

To ensure data comparability, sampling and analysis for all samples will be performed using standardized analytical methods and adherence to the quality control procedures outlined in the methods and this QAPP. Therefore, the data will be comparable.

4.0 SAMPLING PROCEDURES

4.1 Sampling Process Design

As part of the remedial design process, U.S. EPA Region II DESA/HWSB/SST personnel will collect soil samples at the Site. Samples will be collected directly from open test pits using stainless steel scoops and place in stainless steel bowls. Soil sampling will follow methods as described in *U.S. EPA/ERT SOP #2012: Soil Sampling* which can be found as Appendix D. Sample locations will be chosen according to a Systematic Random Sampling Method. The samples will be taken within a 50-foot square grid pattern, at four different depths. The depths will be 0 to 3 inches, 12 inches, 24 inches and 36 inches. It is anticipated that the maximum number of samples taken in this event would be sixty-eight.

A total of sixty-eight (68) soil samples will be collected including QA/QC samples. For quality assurance, quality control purposes, four (4) blind duplicate, four (4) matrix spike and duplicates, and four (4) background sample will be collected.

Samples will be delivered hand delivered to the U.S. EPA Mobile Laboratory in Edison NJ and shipped via FEDEX to the CLP Laboratory within 24 hours of sampling. Each sample will be analysis for TAL metals at the Mobile Laboratory according to U.S. EPA. January 2008. SOP # *MAL-3: Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples by Inductively Coupled Plasma-Mass Spectrometry,* Revision# 3, DESA/HWSB. Edison, NJ (Appendix E) and samples for PCBs will analysis according to U.S. EPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analysis, Multi-Media, Multi-Concentration (SOM01.2) Office of Emergency and Remedial Response (OERR), Analytical Operations Center (AOC), Washington, DC (Appendix G).

Each sample will be collected by a member of the US EPA Region II, DESA/HWSB. The sample collection will be in accordance with U.S. EPA (Environmental Protection Agency) .January 1991. Environmental Response Team (ERT) Standard Operating Procedure (SOP) *#2012: Soil Sampling;* from the *Compendium of ERT Soil Sampling and Surface Geophysics Procedures*. OSWER Directive 9360.4-02. Interim Final. EPA/540/P-91/006. Office of Emergency and Remedial Response (OERR), Washington, DC (Appendix D).

To assess error associated with analyte interference with the quantitation of other analytes and error due to laboratory bias and precision, Matrix Spike and Matrix Spike Duplicate for organic samples (MS/MSDs) and Matrix Spike and Duplicate for inorganic samples will be collected. Sample collection frequency for this site will be one MS/MSD or MS/D per twenty (20) soil samples collected per analytical parameter/fraction analyzed. Double sample collection volume is required for both MS/MSD and MS/D analysis.

To assess sample collection precision and data representativeness, a field replicate sample will be collected. The field replicate will be used to evaluate errors associated with sample heterogeneity, sampling methodology and analytical procedures. Sample collection frequency will be one field replicate per twenty (20) soil samples collected per analytical parameter/ fraction analyzed.

To assess sample accuracy, field quality control samples will be collected including a rinsate blank. The blanks will be used to evaluate errors arising from potential cross-contamination due to: improper handling of samples by collectors and lab personnel; improper decontamination procedures; improper shipment and storage; and/or on-site atmospheric contaminants. Rinsate

blanks will be prepared in the field by pouring deionized water over decontaminated sampling equipment which in this case would entail pouring the water over stainless steel scoops and bowls. Sample frequency will be one rinsate blank for each type of equipment used per each day a decontamination event is carried out. Rinsate blanks will be analyzed for TAL metal and PCBs

4.2 Sampling Methods Requirements

4.2.1 Standard operating procedures

As previously stated, all soil sampling will be in accordance with the *U.S. EPA Region II CERCLA Quality Assurance Manual*; and *U.S. EPA Superfund Program Representative Sampling Guidance* OSWER Directive 9360.4-10, Interim Final, EPA/540/R-95/141, Office of Emergency and Remedial Response (OERR), Washington, D.C. Furthermore, the specific Standard Operating Procedure (SOP) utilized for soil sampling is the *U.S. EPA ERT SOP #2012: Soil Sampling*; from the *Compendium of ERT Soil Sampling and Surface Geophysics Procedures.*

4.2.2 Sample collection methodology

All samples including QA/QC samples will be collected by personnel from the USEPA Region II DESA/HWSB. Sample locations will be demarcated on-site utilizing flags. Test pits will be dug to a maximum depth of four feet. The total number of soil samples includes: sixty-eight (68) environmental samples to include, four (4) field replicates (i.e., laboratory quality control sample), four (4) MS/Ds, four (4) Background samples. The number of rinsate blanks will be at a rate of one per each day equipment is decon. As previously stated, the specific SOPs utilized will be the *U.S. EPA ERT SOP #2012: Soil Sampling,* from the *Compendium of ERT Soil Sampling and Surface Geophysics Procedures.* Samples will be collected at depth of zero (0) to three (3) feet utilizing stainless steel scoops and bowls.

For MS/D sample collection, double volume is required. MS/MSD samples require three times the volume. Sample preservation for all environmental samples required only wet ice with samples cooled to 4°C. All sample bottles comply with the *U.S.EPA Specifications and Guidance for Contaminant-Free Sample Containers.* Samples will be maintained in sealed cooler(s) with ice at 4°C. TAL metals samples will be hand delivered to the laboratory in Edison, NJ and PCBs samples shipped via FEDEX to the CLP Laboratory within 24 hours of sampling.

4.2.3 Sample Containers, Volume, Preservation, and Holding Times

Sample container type, volume, preservation, and holding times are dependent upon analytical parameter and fraction and are matrix specific. Table 4 outlines the sample container type, volume, preservation, and holding times for samples to be collected on-site.

4.2.4 Field measurement data collection

Air monitoring will be conducted at this site by contract site support personnel. Field data sheets and the field notebook will be completed for each sample collected. The *Soil Field Data Sheet* will record sample location; upper limit of observed contamination; sample depth; time of sample collection; lowest depth of observed contamination; laboratory sample number; laboratory sample analysis; private laboratory sample number; and sample collection notes and/or observations. The field notebook will be completed as provided for in Section 8.4: Data

Quality Management of the QAPP.

4.2.5 Sampling Equipment Decontamination

Soil samples will be collected using stainless steel scoops and bowls. The tools to be used on-site will also be decontaminated prior to site activities. Decontamination of equipment will be done at the Edison facility and on-site whenever necessary. A rinsate blank sample will be collected each day for each decontamination event conducted in the field. The sampling equipment will also be decontaminated after the sampling event is complete at the US EPA Edison facility. All decontamination procedures will be in accordance with the following:

- *U.S. EPA ERT SOP #2006: Sampling Equipment Decontamination* from the *Compendium of ERT Soil Sampling and Surface Geophysics Procedures* (Appendix B).
- *U.S. EPA Region II CERCLA Quality Assurance Manual*

4.2.6 Management of Investigative-Derived Wastes (IDW)

The wastes that are anticipated on being generated during this sampling event are soils and personnel protective equipment (i.e. tyveks, booties, etc.). The excess soils will be placed back into the hole from which it was generated.

The personnel protective equipment will be cleaned of gross contamination, bagged and disposed of appropriately. All of the anticipated waste will be left on-site.

5.0 SAMPLE CUSTODY

5.1 Special Training Requirements/Certification

To perform the operations of this sampling event, SST will be dealing with the sampling activities on-site. This can imminently expose SST personnel to potential occupational environmental hazards. As a result, it is important for SST field personnel to be familiar with:

- Identifying methods and procedures for recognizing, evaluating and controlling hazardous substances.
- Identifying concepts, principles, and guidelines to properly protect SST field personnel.
- Discussing regulations and action levels to ensure the health and safety of SST field oversight personnel.
- Discussing the fundamentals needed to develop organizational structures and standard operating procedures to mitigate potential environmental hazards.
- Demonstrating the selection and use of dermal and respiratory protective equipment.
- Demonstrating the selection and use of direct-reading air monitoring instrumentation

In practice, not all of the potential environmental hazards which may be inherent to a site can be

readily anticipated. To mitigate these circumstances, SST field personnel must learn, follow, and enforce the published rules governing occupational health and safety. In addition, they must maintain awareness and exercise common sense and good judgment when confronting possible unsafe situations. Consequently, all divisions and offices at the Edison facility are required to provide their staff with the necessary safety training and equipment to perform their assigned duties.

For SST personnel, all training and certification requirements are to be undertaken in accordance with the protocols set forth in the 1995 "Edison Health and Safety Manual." Specifically, this requires completion of the forty (40) hour "Hazardous Materials Incident Response Operations" training pursuant to Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1910.120 and U.S. EPA Order 1440.2. This is to be supplemented by completing the twenty four (24) hour OSHA sanctioned supervised on-site operations certification training. In conjunction, SST personnel are also to maintain certifications for:

- The supplemental eight (8) hour annual health and safety refresher training.
- Fit testing for atmosphere supplying respirators (Level B) and air purifying respirators (Level C).
- Enrollment in a physician authorized medical monitoring program.

5.2 Sample Handling and Custody Requirements

5.2.1 Sample handling and shipment

Field data sheets and the field notebook will be completed for each sample collected. All field and sample documents will be legibly written in indelible ink. Any corrections or revisions will be made by lining through the original entry and initialing the change. The *Field Data Sheet* will record sample location; sample depth; sample type; equipment used; analysis; sample characteristics; sampling personnel and weather. For reference, the field data sheets are presented in Appendix F. The field notebook will be used by field personnel to record all aspects of sample collection and handling, visual observations, and field measurements. The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. The sample team or individuals performing a particular sampling activity are required to maintain a field notebook. This field notebook will be a bound weatherproof logbook that shall be filled out at the location of sample collection immediately after sampling. All entries will be signed by the individuals making them. At a minimum, the logbook will contain sample particulars including sample number, collection time, location, descriptions, methods used, daily weather conditions, field measurements, name of sampler(s), sample preservation, names of on-site personnel, and other site-specific observations including any deviations from protocol.
Sample labels will be securely affixed to the sample container and include only the sample identification number as per protocol. The sample labels will be sealed with clear tape to maintain sample label integrity. Once sealed, samples will be placed in a polyethylene bag inside a waterproof High Density Polyethylene (HDPE) cooler. The coolers will be packed with sufficient wet ice to cool the samples to 4°C. A temperature blank will be in each cooler.

All samples will be the responsibility of the Project Officer to see that the samples are hand delivered by a U.S. EPA employee to the MAL and shipped via FEDEX to the CLP LAB. All samples will be shipped within 24 hours of sampling.

5.2.2 Sample custody procedures

Standard U.S.EPA Chain-of-Custody Procedures will be followed for all samples and be in accordance with the U.S.EPA Region II *CERCLA Quality Assurance Manual.* The Forms II Lite software will be used to generate the Chain of Custodies for both the MAL and CLP. The Traffic Report & Chain of Custody Records will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept for each individual who has signed it. The chain-of-custody records will include, at a minimum, sample identification number, number of samples collected, sample collection date and time, sample type, sample matrix, sample container type, sample analysis requested, sample preservation, and the name(s) and signature(s) of samplers and all individuals who have had custody. Sample labels will only include the sample identification number to prevent any conflict of interest issues for samples. Custody seals will demonstrate that a sample container or cooler has not been opened or tampered with. The sampler will sign and date the custody seal and affix it to the container and/or cooler in such a manner that it cannot be opened without breaking the seal.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

6.1 Instrument Calibration and Frequency

For the calibration and preventative maintenance:

The EPA Mobile Laboratory in Edison, NJ will follow:

- U.S. EPA Mobile Laboratory, Edison, NJ, SOPs # C-91: *Analysis of Pesticides and PCBs in Aqueous, Soil/Sediment, and Waste Oil/Transformer Fluid Matrices,* Revision Number 2.0 dated: March 2007 (Appendix E)

The CLP Laboratory will follow:

- U.S. EPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analysis, Multi-Media, Multi-Concentration (SOM01.2). Office of Emergency and Remedial Response (OERR), Analytical Operations Center (AOC), Washington, DC (Appendix G).

7.0 ANALYTICAL PROCEDURES

7.1 Analytical Methods Requirements

The Mobile Laboratory will be using SOP # *MAL-3* (Appendix E)

The CLP Laboratory will be using U.S. EPA CLP SOW # SOM01.2 (Appendix G)

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

8.1 Data Review, Validation and Verification Requirements:

The Mobile Laboratory validates their data according to the: U.S. EPA. January 2008. SOP # *MAL-3: Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples by Inductively Coupled Plasma-Mass Spectrometry,* Revision# 3, DESA/HWSB. Edison, NJ.

The CLP Laboratory validates their data according to the: Standard methods and references will be used as guidelines for data reduction and reporting. All CLP SOW data generated by the CLP laboratory will be reported in standard CLP deliverable format. Also, all Non-RAS data generated by a private laboratory will be reported in standard CLP deliverable format. For a CLP laboratory, all data validation reports will be summarized according to:

- HWSS SOPs: HW-33: U.S.EPA (Environmental Protection Agency). March 2003. *Contract Laboratory Program (CLP) Statement of Work (SOW) for the Analysis of Low/Medium Concentrations of Volatile Organic Compounds (SOM01.2)*

8.2 Validation and Verification Methods

U.S. EPA. January 2008. SOP # *MAL-3: Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples by Inductively Coupled Plasma-Mass Spectrometry,* Revision# 3, DESA/HWSB. Edison, NJ (Appendix E).

For CLP Lab: All CLP data will be validated by the following HWSS Data Validation SOPs: HW-33: U.S.EPA *CLP SOW for the Analysis of Low/Medium Concentrations of Volatile Organic Compounds [SOM01.2].*

8.3 Data Acquisition Requirements

Data acquisition from non-direct measurements such as data from databases or literature is not anticipated at this time. Therefore, this is not applicable.

8.4 Data Quality Management

All project data and information must be documented in a format that is usable by project personnel. This section of the QAPP describes how project data and information will be documented, tracked, and managed from their generation in the field to final use and storage in a manner that ensures data integrity and defensibility. All field and sample documents will be legibly written in indelible ink. Any correction or revisions will be made by lining through the original entry and initialing the change.

The following field and sample documentation will be maintained. Examples are presented in Appendix F

- The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. The sample team or individuals performing a particular sampling activity are required to maintain a field notebook. This field notebook will be a bound weatherproof logbook that shall be filled out at the location of sample collection immediately after sampling. All entries will be signed by the individuals making them. At a minimum, the logbook will contain sample particulars including sample number, collection time, location, descriptions, methods used, daily weather conditions, field measurements, name of sampler(s), sample preservation, and other site-specific observations including any deviations from protocol.

- Field data sheets and corresponding sample labels are used to identify samples and document field sampling conditions and activities. The field data sheets will be completed at the time of

sample collection and will include the following: sample location; upper limit of observed contamination; sample depth; time of sample collection; lowest depth of observed contamination; laboratory sample number; laboratory sample analysis; private laboratory sample number; private laboratory sample analysis; and sample collection notes and/or observations.

- Sample labels will be securely affixed to the sample container and include only the sample identification number as per protocol to prevent any conflict of interest issues. The sample labels will be sealed with clear tape to maintain sample label integrity.

- The Traffic Report & Chain of Custody Records will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept for each individual who has signed it. The chain-of-custody records will include, at a minimum, sample identification number, number of samples collected, sample collection date and time, sample type, sample matrix, sample container type, sample analysis requested, sample preservation, and the name(s) and signature(s) of samplers and all individuals who have had custody.

- Custody seals will demonstrate that a sample container or cooler has not been opened or tampered with. The sampler will sign and date the custody seal and affix it to the container or cooler in such a manner that it cannot be opened without breaking the seal.

- Procedures are provided for project personnel to make changes, take corrective actions and document the process through Corrective Action Request Forms. Corrective action can occur during field activities, laboratory analysis, data validation, and data assessment. For further information, refer to Section 13.0: Corrective Action.

9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

9.1 Quality Control Requirements

As previously stated, to assess data quality, PARCC (Precision, Accuracy, Representativeness, Completeness, and Comparability) parameters will be utilized. These essential data quality elements are delineated as follows.

9.1.1 Data precision

Precision is defined as a measure of the reproducibility of individual measurements of the same property under a given set of conditions. The overall precision of measurement data is a mixture of sampling and analytical factors.

9.1.1.1 Analytical precision

- For Organic Samples:

To assess error associated with analyte interference with the quantitation of other analyses and error due to laboratory bias and precision, Matrix Spike and Matrix Spike Duplicate samples (MS/MSDs) will be collected. One sample will have three aliquots. The first aliquot will be analyzed routinely for the parameters of interest, while the other two aliquots will be spiked with known quantities of the parameters of interest prior to analysis. The Relative Percent Difference (RPD) between the two results will be calculated and used as an indication of the precision of the

analyses performed.

$$RPD = \frac{|MSR - MSDR|}{(MSR+MSDR)/2} \times 100$$

Where: MSR = Matrix Spike Recovery
MSDR = Matrix Spike Duplicate Recovery
| | indicates absolute value of the difference.

The analytical precision for the analytical methods chosen in terms of estimated RPD.

- For Inorganic Samples:

To assess error associated with analyte interference with the quantitation of other analyses and error due to laboratory bias and precision, Matrix Spike and Duplicate samples (MS/Ds) will be collected. The Relative Percent Difference (RPD) between the two results will be calculated and used as an indication of the precision of the analyses performed.

$$RPD = \frac{|S - D|}{(S+D)/2} \times 100$$

Where: S = Sample Result (original)
D = Duplicate Result
| | indicates absolute value of the difference.

The analytical precision for the analytical methods chosen in terms of estimated RPD.

9.1.1.2 Sample collection precision

Sample collection precision will be assessed by collecting field replicate samples. The field replicates will be used to evaluate errors associated with sample heterogeneity, sampling methodology and analytical procedures. The analytical results from these samples will provide data on the overall measurement precision.

9.1.2 Data accuracy

Accuracy is defined as the degree of difference between measured or calculated values and the true value. The closer the numerical value of the measurement comes to the true value, or actual concentration, the more accurate the measurement is. It is difficult to measure accuracy for the entire data collection activity. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation and analysis techniques.

9.1.2.1 Analytical accuracy

Analytical accuracy will be assessed through the analysis of quality control samples specified in the analytical method (i.e., matrix spike). The analytical accuracy will expressed as the percent recovery (%R) of an analyte which has been added to the environmental sample at a known concentration before analysis and is calculated according to the following equation. See table 5 for estimated accuracy.

$$\%R = \frac{[SSR - SR]}{SA} \times 100$$

Where: SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added

Both the analytical precision and accuracy for the analytical methods chosen in terms of estimated percent recovery.

9.1.2.2 Sample collection accuracy

To assess sample accuracy, field quality control samples will be collected and evaluated including rinsate blanks. The blanks will be used to evaluate errors arising from potential cross-contamination due to: improper handling of samples by collectors and lab personnel, improper decontamination procedures, improper shipment and storage, or on-site atmospheric contaminants.

9.1.3 Data Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or and environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program and proper laboratory protocol. The representativeness criterion is best satisfied by making certain that sampling locations are selected properly and a sufficient number of samples are collected. Therefore, data representativeness will be assessed by collecting field replicate samples. The field replicates are by definition equally representative of a given point in space and time.

In addition, as previously stated, data representativeness will be satisfied by ensuring that the sampling program is followed according to the *U.S. EPA Region II CERCLA Quality Assurance Manual*; and the *U.S. EPA Superfund Program Representative Sampling Guidance* for soil, Volume 1. Also, proper sampling techniques will be used in accordance with the *U.S. EPA ERT SOP #2012: Soil Sampling*; from the *Compendium of ERT Soil Sampling and Surface Geophysics.*

Furthermore, proper analytical procedures will be followed and holding times of the samples will not be exceeded in the laboratory.

- The U.S. EPA Mobile Laboratory, Edison, uses SOP # *MAL-3: Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples by Inductively Coupled Plasma-Mass Spectrometry,* Revision# 3, DESA/HWSB. Edison, NJ (Appendix E).

- The U.S. EPA Contract Laboratory Program (CLP) uses U.S. EPA. Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analysis, Multi-Media, Multi-Concentration (SOM01.2). Office of Emergency and Remedial Response (OERR), Analytical Operations Center (AOC), Washington, DC. (Appendix G)

9.1.4 Data Comparability

Comparability is defined as the confidence with which one data set can be compared to another. Field and laboratory procedures greatly affect comparability. Therefore, to optimize comparability, sampling and analysis for all samples will be performed using standardized analytical methods and adherence to the quality control procedures outlined in the methods and this QAPP. Therefore, the data will be compared.

9.1.5 Data Completeness

Completeness is defined as the measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Data completeness will be expressed as the percentage of valid data obtained from measurement system. For data to be considered valid, it must meet all the acceptable criteria including accuracy and precision, as well as any other criteria specified by the analytical method used. Therefore, all data points critical to the sampling program in terms of completeness will be 100% validated by USEPA Region II DESA/HWSB in accordance with the US EPA Region 2 SOPs. With 100% validation, the rationale for considering data points non-critical is not required.

10.0 Performance and Systems Audits

10.1 Assessments and Response Actions

No performance audit of field operations is anticipated at this time. If conducted, performance and systems audits will be in accordance with:

- U.S. EPA (Environmental Protection Agency) Region II. October 1994. *SOP No. HW-20: Standard Operation Procedure (SOP) for Conducting CERCLA Field Audits.* Revision 0. Division of Environmental Services and Assessment, Hazardous Waste Support Branch, Hazardous Waste Support Section, Edison, NJ.

11.0 PREVENTIVE MAINTENANCE

11.1 Instrument/Equipment Testing, Procedures & Scheduled Inspection and Maintenance Requirements

As previously stated, calibration and preventative maintenance of analytical laboratory equipment will follow procedures as specified in paragraph 8.0 Data Reduction, Validation and Reporting of the QAPP.

11.2 Inspection/Acceptance Requirements for Supplies and Consumables

All blanks (e.g., rinsate blank) will be prepared using demonstrated analyte free, deionizer water as specified in the U.S. EPA Region II *CERCLA Quality Assurance Manual.* The demonstrated analyte free water meets the assigned criteria values for the Contract Laboratory Program (CLP) Contract Required Detection Limits (CRQLs) and Contract Required Quantization Limits (CRQLs) as outlined in the most recent CLP Statements of Work (Sows). The criterion is as follows: purgeable organics < 10 ppb; semi-volatile organics < CRQL; pesticides < CRQL; PCBs < CRQL; inorganic < CRDL. However, for common laboratory contaminants (i.e., methylene chloride, acetone, toluene, 2-butanone, and phthalates), the allowable limits are three times the respective CRQLs. All sample bottles comply with OSWER Directive #9240.0-05A; U.S. EPA *Specifications and Guidance for obtaining Contaminant-Free Containers*, EPA 540/R-93/051.

12.0 SPECIFIC ROUTINE PROCEDURES/MEASUREMENT PARAMETERS INVOLVED

12.1 Reconciliation with Data Used to Assess PARCC for Quality Objectives Measurement

Sample collection precision will be evaluated by collecting and analyzing both a field duplicate

sample and collocated samples (i.e., split samples). The field duplicate samples will be used to evaluate errors associated with sample heterogeneity, sampling methodology and analytical procedures. The analytical results from the field duplicate samples will provide data on the overall measurement precision. Precision will be reported as the relative percent difference (RPD) for two measurements. The acceptance criteria for the field duplicate samples are located in Table 5.

Data will be generated through the collection of soil samples at the Jewett White Lead Company Site. This data will be used to determine if there is soil contamination at the site, the extent of contamination, evaluate potential health threats, and determine the environmental impacts.

13.0 CORRECTIVE ACTION

13.1 Assessments and Response Actions

Procedures are provided for project personnel to make changes, take corrective actions and document the process through Corrective Action Request Forms. Corrective action can occur during field activities, laboratory analysis, data validation, and data assessment.

Corrective action in the field may be necessary when the monitoring network design is changed. A change in the field includes: increasing the number or type of samples or analyses; changing sampling locations; and/or modifying sampling protocol. When this occurs, the project officer or project QA officer will identify any suspected technical or QA deficiencies and note them in the field logbook. The project QA officer will be responsible for assessing the suspected deficiency and determining the impact on the quality of the data. Development of the appropriate corrective action will be the responsibility of the OSC.

Laboratory corrective action will be in accordance,

- For EPA Mobile Laboratory: SOP # *MAL-3: Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples by Inductively Coupled Plasma-Mass Spectrometry,* Revision# 3, DESA/HWSB. Edison, NJ (Appendix E).

- For The U.S. EPA Contract Laboratory Program (CLP): U.S. EPA. Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analysis, Multi-Media, Multi-Concentration (SOM01.2). Office of Emergency and Remedial Response (OERR), Analytical Operations Center (AOC), Washington, DC. (Appendix G)

14.0 QA REPORTS TO MANAGEMENT

14.1 Distribution List

Table 3 identifies project personnel who shall receive copies of the approved QAPP and any subsequent revisions.

14.2 Reports to Management

The data collected as a result of sampling activities; will be organized, analyzed and summarized in a final project report that will be submitted to the all project officers according to the Project Schedule. The report will be prepared by the project officer or project quality assurance officer

and include appropriate data quality assessment.

The sampling and analysis protocol is listed as Table 4.

TABLE 1 – ACTIVITY SCHEDULE	
ACTIVITY	DATE
Date of the request which initiates the project.	July 9, 2008
Review and Background information	July 9, 2008
Date by which the project plan will be submitted to all interested parties.	July 21, 2008
Obtain site access	Prearranged by ERRD
Date by which comments on the plan are to be received by the project officer.	July 31, 2008
Date(s) of the field reconnaissance.	July 10, 2008 & October 14, 2008
Date(s) of the field sampling activities.	December 15-23, 2008
Date(s) the samples will be submitted to the laboratory for analysis.	All samples will be hand-delivered to the Mobile Laboratory and shipped via FEDEX to CLP Laboratory within 24 hours of sampling.
Date(s) by which all analyses are to be completed and the data submitted to the project officer.	45 day turnaround
Date(s) the data will be entered into STORET or other computerized systems.	Not applicable.
Date of the completion of the draft interim/final project report. (Sampling Trip Report)	Within one week of the end of the sampling event
Date for the issuance of the final project report.	Within two weeks of receipt of validated analytical data.

TABLE 2 – QAPP DISTRIBUTION LIST	
Project Personnel	**Title**
Nick Magriples, On-Scene Coordinator (OSC) ERRD/RAB	Overall Project Coordinator
Idelfonso Acosta, Site Assessment Manager (SAM) ERRD/SPB	Pre-remedial Project Manager
Jan Hagiwara, Site Assessment Manager (SAM) ERRD/SPB	Pre-remedial Project Manager
Michael A. Mercado, DESA/HWSB Superfund Support Team (SST)	Project Officer
Pat Sheridan, DESA/HWSB Superfund Support Team (SST)	Quality Assurance Officer

TABLE 3 – PROJECT/TASK ORGANIZATION	
PROJECT PERSONNEL	**RESPONSIBILITY**
Nick Magriples, On-Scene Coordinator (OSC) ERRD/RAB	Site Project Manager
Idelfonso Acosta, Site Assessment Manager (SAM) ERRD/SPB	Pre-remedial Project Manager
Jan Hagiwara, Site Assessment Manager (SAM) ERRD/SPB	Pre-remedial Project Manager
Michael A. Mercado, Project Officer DESA/Hazardous Waste Support Branch	Project Management/Safety Officer Sampling Operations
Mark Denno, Sampler DESA/Hazardous Waste Support Branch	Sampling Operations/ Field Support
Diane Salkie DESA/Hazardous Waste Support Branch	Field Support
Christina Leung DESA/Hazardous Waste Support Branch	Field Support
Pat Sheridan, Project Quality Assurance Officer DESA/ Hazardous Waste Support Branch	Report QA
Robert Finke, Environmental Scientist DESA/ Hazardous Waste Support Branch	Mobile Laboratory analysis of TAL metals analysis/ technician
CLP Lab	Laboratory analysis of PCB sample, laboratory QC, data processing activities
DESA/Hazardous Waste Support Branch	Overall QA

TABLE 4 – Consolidated Iron Site
Remedial Investigation - Soil Sampling
Sampling and Analysis Protocols and Parameters

Sample Type	Number of Samples	Matrix	Parameter/Fraction	Sample Container[1]	Sample Preservation	Analytical Method	Method Detection Limit	Holding Time[2]
Environmental	68*	Soil	TAL Metals	(1) 4 oz. Wide-mouth glass jar	Cool to 4 °C	MAL#6	Analyte Specific 0.02 – 22.48 mg/kg	6 months
	20*	Soil	TCL PCBs	(1) 4 oz. Wide-mouth glass jar	Cool to 4 °C	SOM01.2	33 ug/kg	10 days to extract, 40 days analyze
Rinsate Blank	2	Aqueous	TAL Metals	(1) 1 Lt. Wide-mouth Plastic Bottle	Cool to 4 °C w/pH 2 (HNO_3)	MAL#6	Analyte Specific (0.07 – 161 ug/l)	6 months
			TCL PCBs	(2) 1lt. Wide-mouth amber glass jar	Cool to 4 °C	SOM01.2	1 ug/L	5 days to extract, 40 days analyze

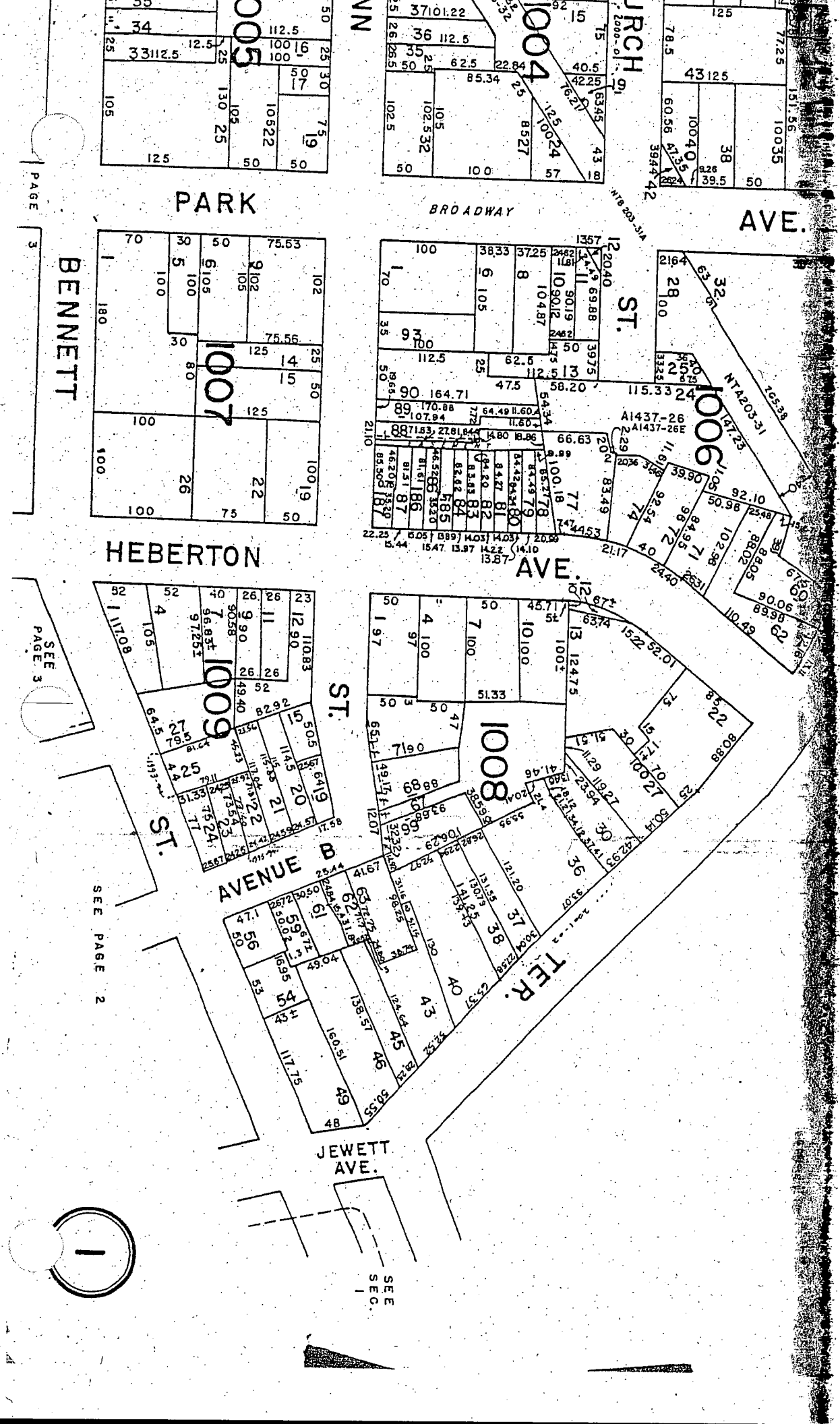
Legend:
[1] The number in parentheses in the "Sample Container" column denotes the number of containers needed.
All sample bottles comply with OSWER Directive #9240.0-05A, *Specifications and Guidance for obtaining Contaminant-Free Containers*, EPA 540/R-93/051.
[2] All holding times listed are Contractual Holding Times and are from the date of Verified Time of Sample Receipt (VTSR).
* The number of samples indicated includes four field replicate samples, four MS/Ds, and three background samples.

TABLE 5: PRECISION AND ACCURACY

Laboratory	Sample Parameter/ Fraction	Sample Matrix	Analytical Method	Quantization Limit	Quantization Limit Units	Estimated Accuracy	Accuracy Protocol	Estimated Precision	Precision Protocol
MAL	TAL Metals	Soil	MAL-3	5 – 500 mg/Kg	ppm levels	75 – 125%	CLP-RAS	±20%RPD	MAL-3
CLP	PCBs	Soil	SOM01.2	33 ug/Kg	ppb levels	29%-135%	CLP-RAS	<20%RPD	CLP-RAS
MAL	TAL Metals	Aqueous	MAL-3	0.5 – 5000 ug/L	ppb levels	75 – 125%	CLP-RAS	±20%RPD	MAL-3
CLP	PCBs	Aqueous	SOM01.2	1 ug/L	ppb levels	29%-135%	CLP-RAS	<20%RPD	CLP-RAS

APPENDIX A

SITE MAPS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HEBERTON
AVE.
ST.
ST.
AVENUE B
TER.
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SEE PAGE 2
SEE SEC. 1
PAGE 3
1004
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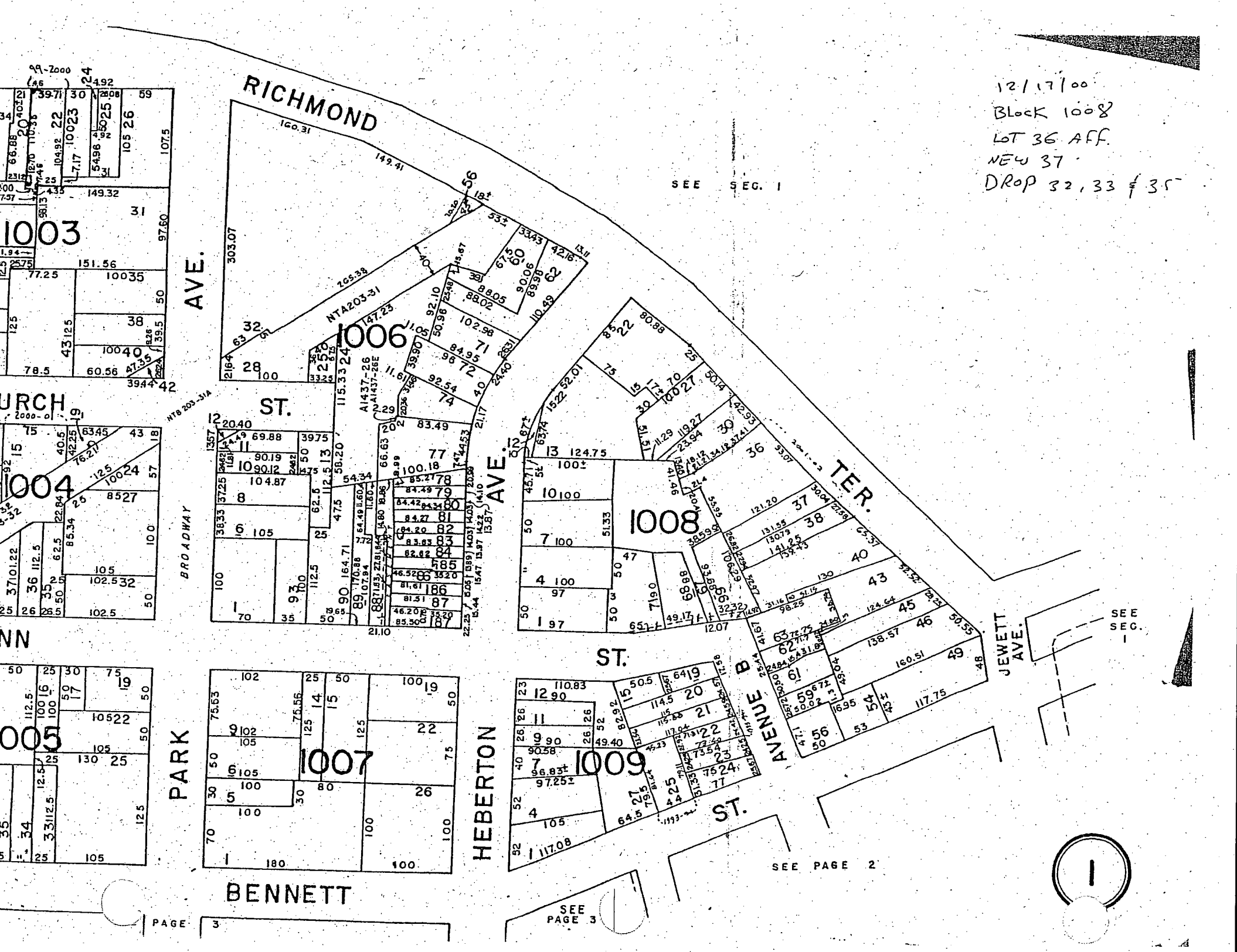
A1437-26E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NEW 37.
DROP 32, 33 & 35
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ST.
BROADWAY
AVE.
TER.
HEBERTON AVE.
B AVENUE
JEWETT AVE.
PARK
BENNETT
1003
1004
1005
1006
1007
1008
1009
SEE SEC. 1
SEE SEC. 1
SEE PAGE 2
SEE PAGE 3
PAGE 3

Photos from EPA site visit, 2000 Richmond Terrace, Staten Island, 6/13/08

Fig. 1. View of 2000 Richmond Terrace from intersection of Park Avenue (on right) & Richmond Terrace

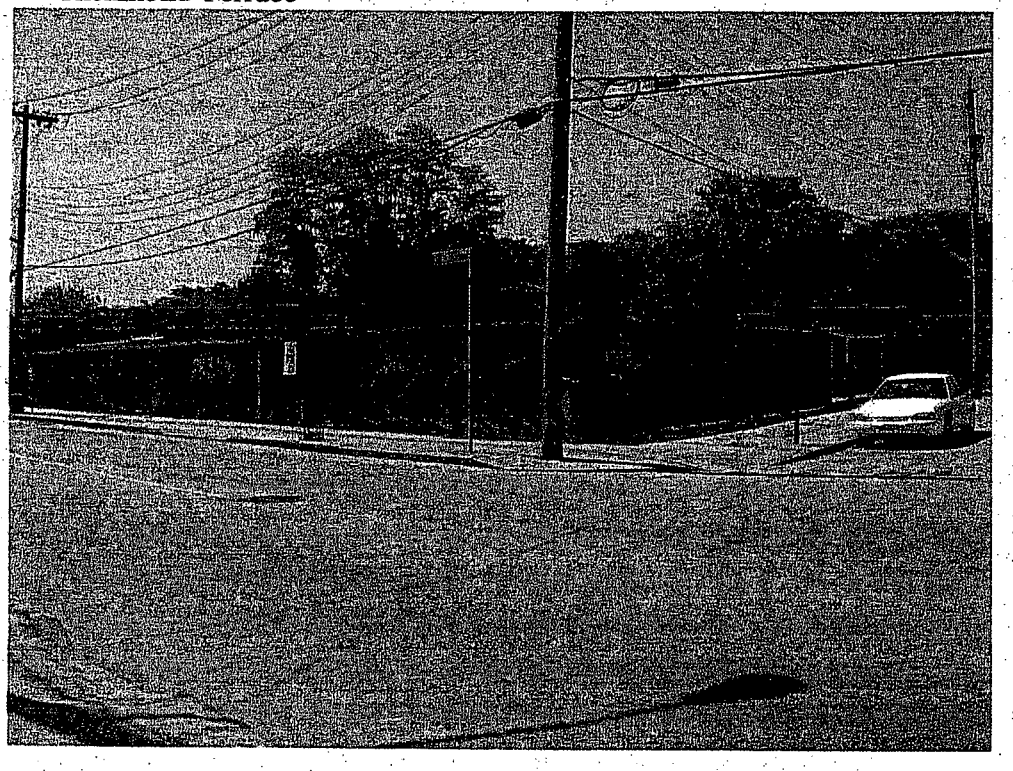


Fig . 2. 2000 Richmond Terrace - view inside fence, from Park Avenue looking NE

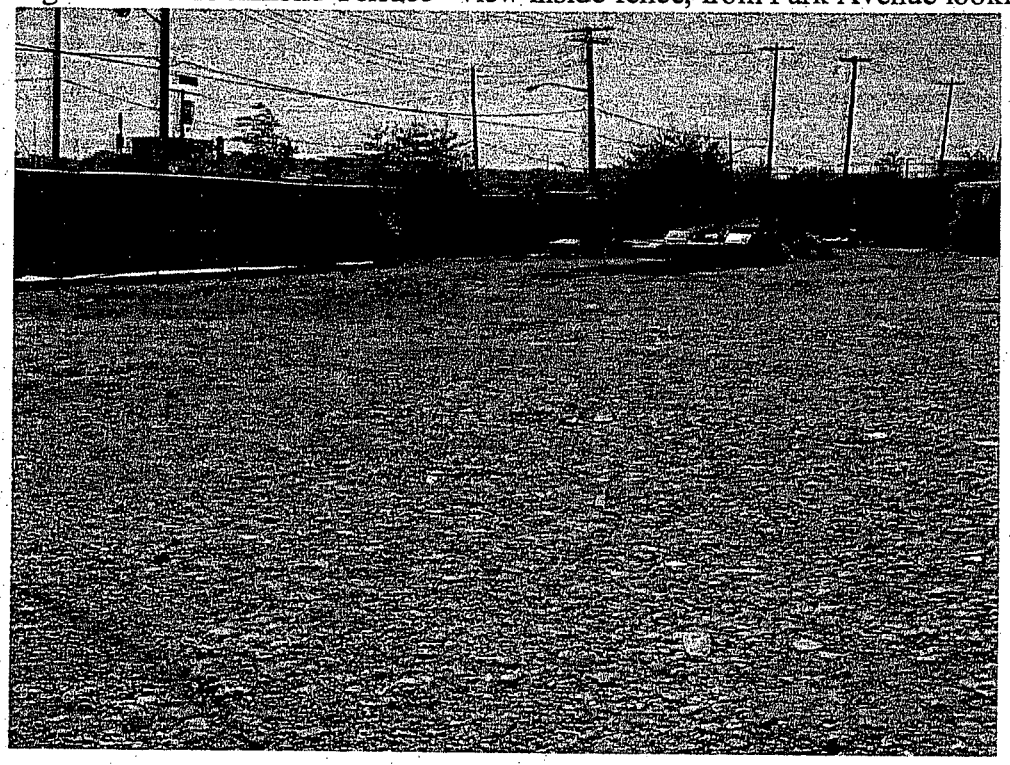
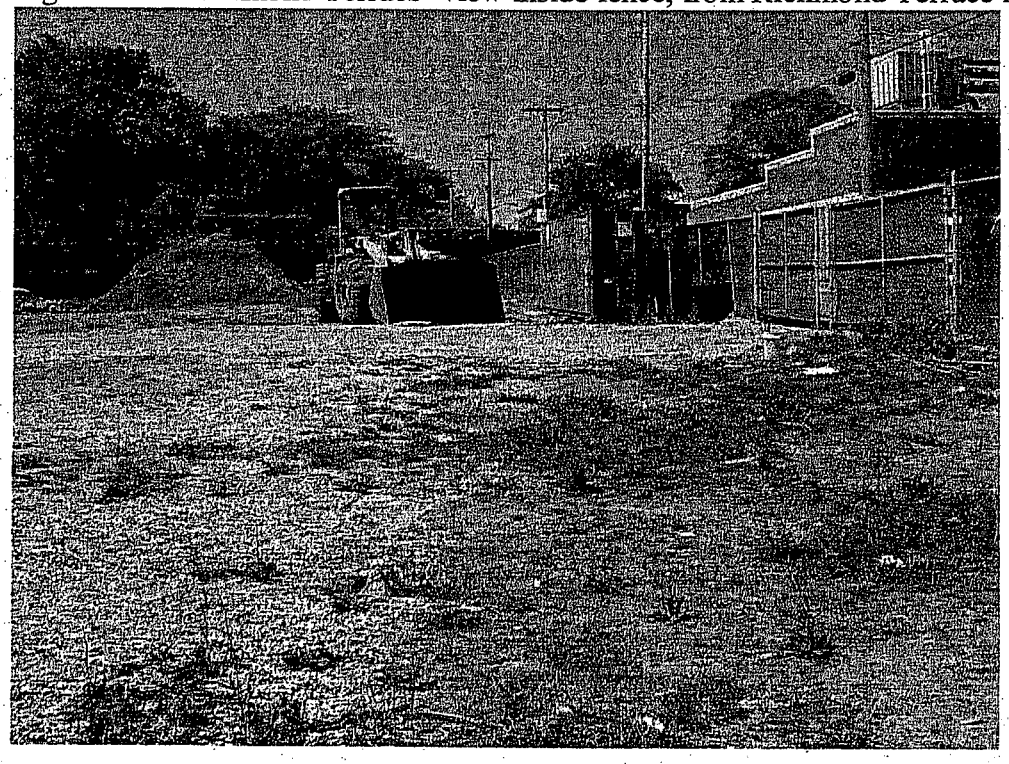
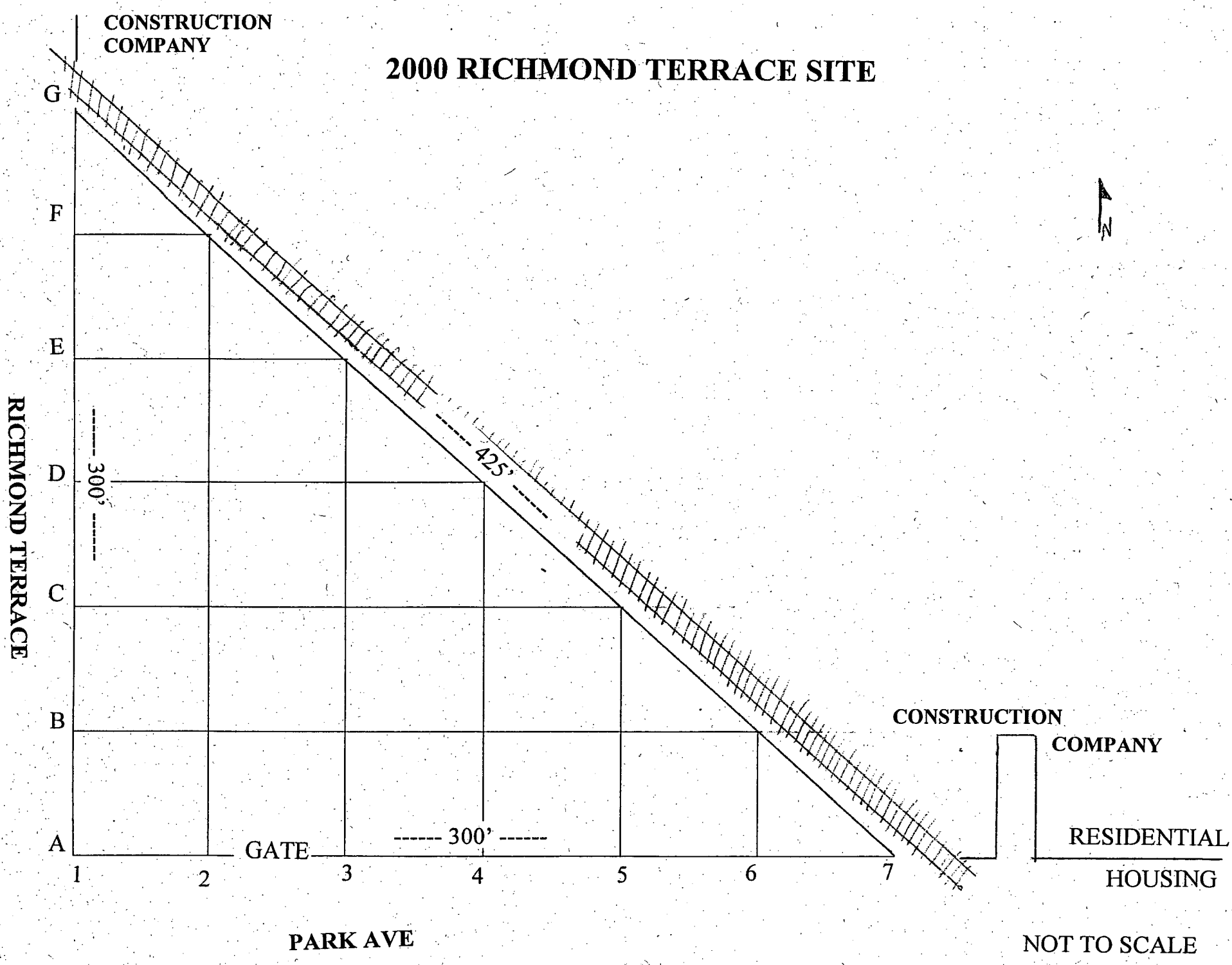


Fig. 3. 2000 Richmond Terrace - view inside fence, from Park Avenue looking SE

Fig. 4. 2000 Richmond Terrace -view inside fence, from Richmond Terrace looking SW



For more photos, please contact:
Jan Hagiwara, EPA Region 2, ERRD-SPB at (212) 637-4321


CONSTRUCTION COMPANY
2000 RICHMOND TERRACE SITE
G
F
E
D
C
B
A
RICHMOND TERRACE
300'
425'
GATE
300'
1
2
3
4
5
6
7
CONSTRUCTION COMPANY
RESIDENTIAL HOUSING
PARK AVE
NOT TO SCALE

APPENDIX B

U.S. EPA (Environmental Protection Agency)
Environmental Response Team (ERT)

Standard Operating Procedure (SOP) #*2006: Sampling Equipment Decontamination*
Office of Emergency and Remedial Response (OERR)
Washington, DC.

January 1991

APPENDIX C

U.S. EPA (Environmental Protection Agency)
Superfund Program Representative Sampling Guidance
OSWER Directive 9360.4-10 Interim Final EPA/540/R-95-141

Office of Emergency and Remedial Response (OERR)
Washington, D.C.

December 1995.

APPENDIX D

U.S. EPA (Environmental Protection Agency)
Environmental Response Team (ERT)
Standard Operating Procedure (SOP) *#2012: Soil Sampling;*
from the *Compendium of ERT Soil Sampling and Surface Geophysics Procedures*
OSWER Directive 9360.4-02
Interim Final EPA/540/P-91/006

Office of Emergency and Remedial Response (OERR), Washington, DC

January 1991

APPENDIX E

U.S. EPA, Region II
Division of Environmental Science and Assessment
Hazardous Waste Support Branch

SOP # MAL-3
Revision# 3

Determination of Trace Metals in aqueous, soil, sediment and Sludge Samples By Inductively Coupled Plasma-Mass Spectrometry

January 2008

APPENDIX F

Field and Sample Documentation Examples

FIELD DATA SHEET

SOIL SAMPLING

SITE NAME	DATE	TIME

SAMPLE LOCATION/DESCRIPTION:

SAMPLE NUMBER:		**SAMPLE TYPE**	
DEPTHS TAKEN:		**SAMPLE ANAL**	
BOTTLE SIZE		**QC TAKEN**	

EQUIPMENT USED:

SAMPLE CHARACTERISTICS:

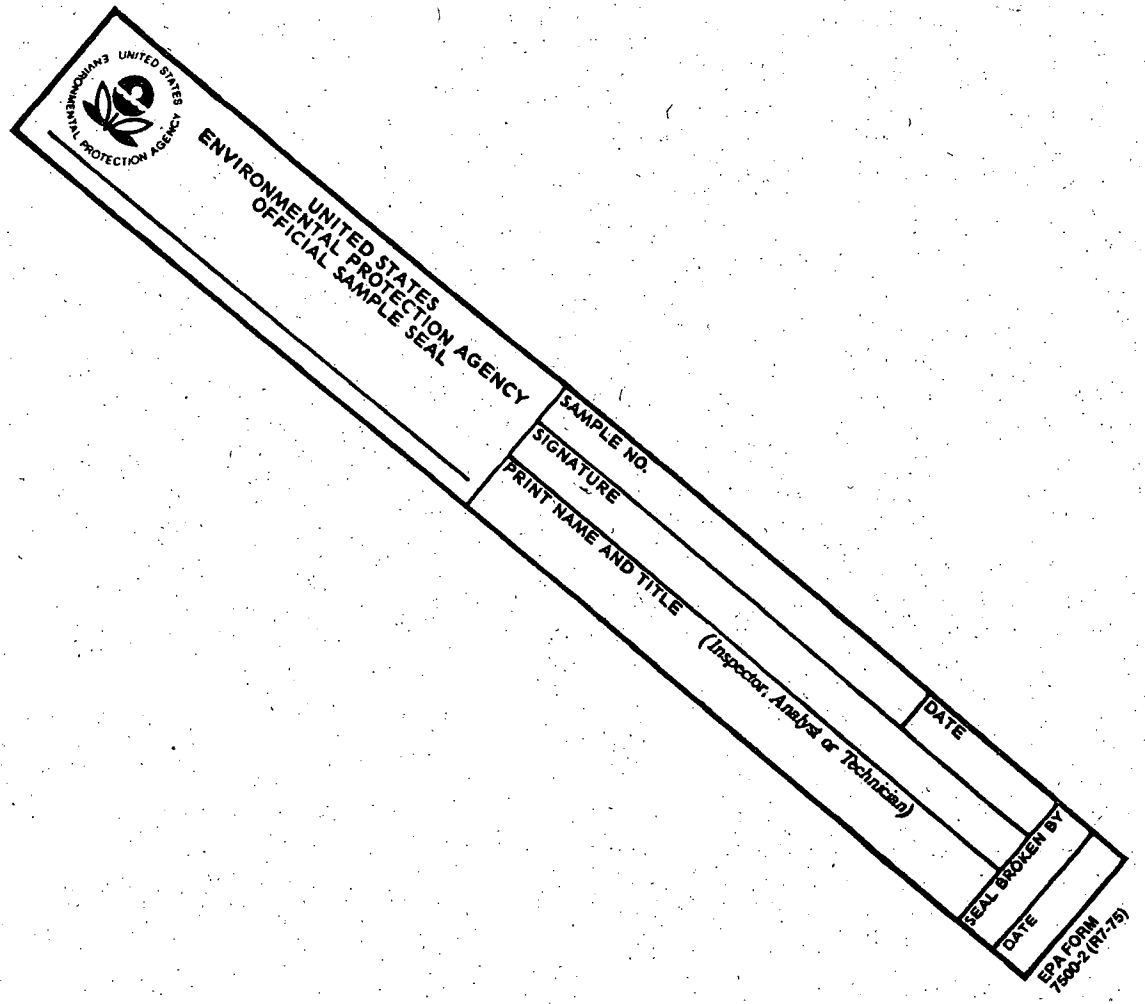
WEATHER:

XRF USED	**YES**	**NO**	**CALIBRATION DATE/TIME:**

DEPTH:	INITIAL WEIGHT:	FINAL WEIGHT:	RESULT:

COMMENTS

SAMPLER'S NAME: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PRINT NAME AND TITLE (Inspector, Analyst or Technician)
DATE
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DATE
EPA FORM 7500-2 (R7-75)